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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/776,832 | 02/11/2004 | Alan F. Evans | SP04-007 | 3020 |

22928 7590 11/03/2006

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| EXAMINER | |
|---|---|
| LEE, DAVID J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2613 | |

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/776,832 | EVANS ET AL. | |
| | Examiner | Art Unit | |
| | David Lee | 2613 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17,19 and 20* is/are rejected.

7)☒ Claim(s) *18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/11/04, 6/20/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claim 15 is objected to because of the following informalities: two duplicate claim 15s exist. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5, 10, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the first and second channels comprise circuitry for generating a first and second optical supervisory channels." According to a skilled artisan, a channel is understood as a wavelength or a specific frequency on the electromagnetic spectrum. Claim 5 requires that the frequency comprises circuitry, rendering the claim indefinite for failing to particularly point out the subject matter which applicant regards as invention. Appropriate correction is required.

Claim 10 recites the limitation "replacing isolators of amplifiers with circulators" in line 3. The limitation presupposes that isolators exist, which renders the claim insufficient in terms of antecedent basis.

Claim 20 recites the limitation "the singlemode cut-off wavelength" in line 4. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 5, 8, 11-13, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Antoniades et al. (US Patent No. 6,115,154).

Regarding claim 1, Antoniades teaches a system for detecting a small fiber loss on a fiber (fig. 4), the system comprising: a first channel having a first wavelength coupled to the fiber and a second channel having a second wavelength different than the first wavelength, the second channel coupled to the fiber (see Abstract: note that two wavelengths, a marker wavelength and the signal wavelength are coupled along the fiber, each of which have different wavelengths of nearby spectral regions; see also col. 4, lines 30-37; note that the two wavelengths are different in that they each comprise "nearby" spectral regions); and at least one photodetector circuitry coupled to the fiber at a monitor point for detecting a change in the power ratio between the first and second channels for detecting a small fiber communication loss at any location along the fiber (450 of fig. 4; see also col. 5, lines 25-29 and Abstract).

Regarding claim 2, Antoniades teaches an alarming switch for alarming (see col. 5, lines 25-27: the function of raising a flag is understood as an alarm) and disconnecting the fiber at a switch point within an amplifier hut close to the monitor point (see col. 6, lines 2-4; note that the switch point location is understood as an "amplifier hut").

Regarding claim 5, as it is best understood in view of the 112 rejection above, Antoniades teaches that the first and second channels comprise circuitry for generating a first and second optical supervisory channels (both the first and second channels are understood as supervisory channels in that both are used to monitor and supervise fiber integrity).

Regarding claim 8, Antoniades teaches a method for detecting a fiber condition along the fiber path (see Abstract), the method comprising the steps of: providing a feedback path to couple with the fiber path to form a feedback loop (see fig. 4: note the loop formed by monitoring circuit 450); and measuring the fiber condition on the fiber path in response to a detected change along the feedback path (see Abstract).

Regarding claim 11, Antoniades teaches a method for detecting fiber integrity, the method comprising the steps of: monitoring two out-of-signal-band wavelengths (see col. 4, lines 35-37); determining the power ratio of the two out-of-signal-band wavelengths (see Abstract), and alarming a fiber integrity tampered condition when the power ratio of the two out-of-signal-band wavelengths changes significantly (see col. 5, lines 25-29).

Regarding claim 12, Antoniades teaches providing a first wavelength outside a signal bandwidth and providing a second wavelength outside the signal bandwidth, the second wavelength different than the first wavelength (see col. 5, lines 37-40: the first wavelength is understood as "outside" a signal bandwidth; note that the two wavelengths are different in that they each comprise "nearby" spectral regions).

Regarding claim 13, Antoniades teaches that the determining step further includes measuring a power variation at the second wavelength compared to the variation at the

first wavelength as the power ratio between the first and second wavelengths (see Abstract).

Regarding claim 20, as it is best understood in view of the 112 rejection above, Antoniades teaches providing the first and second wavelengths having a power level greater than about 0 dBm (see e.g., fig. 3) and within a bandwidth from about the singlemode cut-off wavelength for the fiber to the highest wavelength of the fiber where the attenuation of the fiber is greater than 2 dB from the attenuation at the singlemode cut-off wavelength for the fiber (see e.g., col. 2, lines 28-50).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 3, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniades in view of Chan et al. (US Patent No. 6,009,220).

Regarding claims 3 and 16, Antoniades teaches the limitations of claims 1 and 14 but does not expressly disclose an optical time domain reflectometer (OTDR) at a transmitter for launching an OTDR pulse in a switchable OTDR feedback path coupled to the monitor point for determining the location along the fiber of the small fiber loss. However, OTDR circuitry is well known and widely used in optical transmission systems. For example, Chan teaches an optical communication system using OTDR, wherein a pulse of light is launched into the fiber in order to locate fiber faults (see col. 1,

lines 12-33). It would have been obvious to a skilled artisan at the time of invention to implement this OTDR circuitry in the system of Antoniades in order to efficiently and accurately locate faults in the fiber.

Regarding claim 17, Antoniades teaches disconnecting the fiber at a closest switchable position approximate the precise tampered location for minimizing the fiber security breach (see fig. 4: note that the fiber is disconnected and switched at protection switches 421 or 422).

8. Claims 4 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniades in view of Chan and in further view of Bateman (US Patent No. 5,013,907).

Regarding claim 4, the combined invention of Antoniades and Chan teaches the limitations of claims 1 and 3, but does not expressly disclose a semiconductor optical amplifier (SOA) coupled in the switchable OTDR feedback path with the fiber for amplifying the OTDR pulse. This, however, is well known in the art. For example, Bateman teaches OTDR circuitry comprising a semiconductor optical amplifier (see col. 10, lines 19-21). It would have been obvious to a skilled artisan at the time of invention to incorporate a semiconductor amplifier, such as the one taught by Bateman, in the OTDR circuitry of Antoniades and Chan in order to increase signal strength.

Regarding claim 19, the combined invention of Antoniades and Chan teaches the limitations of claims 1 and 3, but does not expressly disclose a narrow band optical filter for filtering the OTDR pulse. The use of filters to accurately generate a pulse is well known in the art. Bateman teaches a filter to filter an OTDR pulse (18 of fig. 1). It would have been obvious to a skilled artisan at the time of invention to incorporate the

filter of Bateman in the system of Antoniades and Chan in order to accurately generate the OTDR pulse at the specified frequency.

9. Claims 6, 9, 10, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniades.

Regarding claim 6, Antoniades teaches the limitations of claim 1, but does not disclose that the photodetector circuitry further comprises circuitry for indicating that the fiber integrity is intact if the change in ratio detected from a previously measured value is approximately equal to zero and for indicating that the fiber integrity is breached if the change in ratio detected is much greater than zero. Instead, Antoniades discloses that the photodetector circuitry further comprises circuitry for indicating that the fiber integrity is intact if the change in ratio detected from a previously measured value is approximately much greater than unity and for indicating that the fiber integrity is breached if the change in ratio detected is equal to unity (see Abstract). A skilled artisan would have clearly recognized that specific values for determining the integrity of the fiber would be a matter of design choice according to the manner of calculations performed. Absent any teaching of criticality, it would have been a matter of design choice, or given the general environment of the prior art, it would have been obvious to use zero and non-zero, instead of unity and non-unity as taught by Antoniades, as values for determining, respectively, whether the fiber is intact or breached.

Regarding claim 9, Antoniades teaches generating a first marker wavelength on the feedback loop and generating a second marker wavelength on the feedback loop (see Abstract and col. 4, lines 31-37), wherein the generated marker first and second

wavelengths are first and second optical supervisory channels (OSCs) having different wavelengths each having a different wavelength dependent fiber attenuation (note that the two wavelengths are different in that they each comprise "nearby" spectral regions; note also that with different wavelengths are inherently different fiber attenuation characteristics); detecting, at one of the nodes, a power ratio between the generated first marker wavelength and the second marker wavelength (see Abstract). Antoniades does not disclose that the photodetector circuitry further comprises circuitry for indicating that the fiber integrity is intact if the change in ratio detected from a previously measured value is approximately equal to zero and for indicating that the fiber integrity is breached if the change in ratio detected is much greater than zero. Instead, Antoniades discloses that the photodetector circuitry further comprises circuitry for indicating that the fiber integrity is intact if the change in ratio detected from a previously measured value is approximately much greater than unity and for indicating that the fiber integrity is breached if the change in ratio detected is equal to unity (see Abstract). A skilled artisan would have clearly recognized that specific values for determining the integrity of the fiber would be a matter of design choice according to the manner of calculations performed. Absent any teaching of criticality, it would have been a matter of design choice, or given the general environment of the prior art, it would have been obvious to use zero and non-zero, instead of unity and non-unity as taught by Antoniades, as values for determining, respectively, whether the fiber is intact or breached.

Regarding claim 10, as it is best understood in view of the 112 rejection above, Antoniades teaches the limitations of claim 9, including the use of amplifiers and filters (see col. 6, lines 9-11 and lines 44-46), but does not expressly disclose circulators in the

fiber path. However, examiner takes official notice that the use of circulators in transmission systems is well known in the art. It would have been obvious to a skilled artisan at the time of invention to incorporate circulators in the system of Antoniades in order to provide more flexibility and versatility in transmission performance.

Regarding claim 14, Antoniades teaches the limitations of claim 13, but does not expressly disclose that the alarming step comprises indicating when the power variation from a previous to a current value is greater than the absolute value of about 0.25 dB in the power ratio between the first and second wavelengths for detecting a fiber security breach at any location along the fiber. Antoniades does, however, disclose that when the fiber is intact the ratio of the power level of the marker channel to the nearby spectral band is much greater than unity, resulting in a power difference of approximately -35 dB. When there is a fiber cut in sublink 413, the power ratio is close to unity and the difference in power is close to zero dB (see fig. 7 and col. 8, lines 1-23). Absent any teaching of criticality, it would have been a matter of design choice, or given the general environment of the prior art, it would have been obvious to obtain an optimal or customer-requested value by routine experimentation. Therefore, an absolute value of about 0.25 dB in the power ratio have been attainable for one skilled in the art.

Regarding claim 15, Antoniades teaches disconnecting the fiber for minimizing the fiber security breach (see col. 6, lines 2-4; note that the switching of fibers includes the step of disconnecting the breached fiber).

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniades in view of Applicant's admitted prior art.

Regarding claim 7, Antoniades teaches the limitations of claim 1 but does not expressly disclose that the first and second OSC channels comprise a first laser and a second laser correspondingly connected to a first and a second OSC filter for providing the first and second wavelengths at approximately 1510 nm and approximately 1625 nm. However, providing wavelengths at these specified wavelengths using filters is standard in the art. For example, Applicant's prior art teaches that OSC channels are produced using filters to produce wavelengths at 1510 nm and 1625 nm (see paragraph 0004 of Applicant's specification). It would have been obvious to a skilled artisan at the time of invention to use wavelengths at 1510 nm and 1625 nm in order to conform to transmission standards and to exploit the advantages of transmitting signals at these wavelengths.

***Allowable Subject Matter***

11. Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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